

WHAT IS CLAIMED IS:

1. An injection molding apparatus, comprising:
a hot runner manifold including at least two manifold channels;
at least two nozzles, each of said nozzles defining a nozzle channel in fluid communication with one of said manifold channels;
at least one of said nozzles including at least two nozzle bodies removably fastened in tandem, including at least an upstream nozzle body, having an upstream end adjacent said manifold channel, and a downstream nozzle body, having a downstream end adjacent a mold plate;
a separate and removable nozzle tip retained in a downstream end of said downstream nozzle body.
2. The injection molding apparatus of claim 1, wherein said nozzle bodies are removable fastened via a threaded connection.
3. The injection molding apparatus of claim 2, wherein said threaded connection includes a first set of threads and a second set of threads, wherein said first set of threads are a material different from said second set of threads.
4. The injection molding apparatus of claim 2, wherein at least one of said upstream nozzle body or said downstream nozzle body includes threads made from a material different from said nozzle bodies.
5. The injection molding apparatus of claim 2, wherein said threaded connection is via a spacer having a first end threaded with a first nozzle body and a second end threaded with a second nozzle body.
6. The injection molding apparatus of claim 5, wherein said spacer is a different material than said first and said second nozzle bodies.

7. The injection molding apparatus of claim 1, wherein at least one of said nozzles includes an intermediate nozzle body, wherein an upstream end of said intermediate nozzle body is removably fastened to said downstream end of said upstream nozzle body and said downstream end of said intermediate nozzle body is removably fastened to said upstream end of said downstream nozzle body.

8. The injection molding apparatus of claim 1, wherein said nozzle tip is retained in said downstream nozzle body by removably fastened connection.

9. The injection molding apparatus of claim 8, wherein said nozzle tip is retained in said downstream nozzle body via a threaded connection.

10. The injection molding apparatus of claim 1, wherein each of said nozzle bodies includes a heater attached thereto.

11. The injection molding apparatus of claim 10, wherein said nozzle tip does not have a heater attached directly thereto.

12. The injection molding apparatus of claim 1, wherein said upstream end of said upstream nozzle body is coupled to said manifold via a threaded connection.

13. The injection molding apparatus of claim 1, wherein said upstream end of said upstream nozzle body is slidably connected with said manifold.

14. The injection molding apparatus of claim 1, wherein at least one of said plurality of nozzles includes a valve pin and an actuator for

extending and retracting said valve pin.

15. The injection molding apparatus of claim 14, wherein said at least one of said plurality of nozzles includes at least one valve pin guide.

16. The injection molding apparatus of claim 14, wherein a pin support is disposed between an upstream end of said upstream nozzle body and said hot runner manifold.

17. The injection molding apparatus of claim 1, wherein said nozzle tip is made from a different material than said plurality of nozzle bodies.

18. The injection molding apparatus of claim 17, wherein said nozzle tip comprises a material having a high thermal conductivity.

19. The injection molding apparatus of claim 1, further comprising a split mold plate, including a plurality of mold plates.

20. The injection molding apparatus of claim 1, wherein said nozzle tip includes an extended portion that is slidable within a bore in said mold plate.

21. An injection molding apparatus, comprising:
a manifold defining at least two manifold channels;
at least two nozzles, each of said nozzles defining a nozzle channel in fluid communication with one of said manifold channels;
at least one of said nozzles including at least two nozzle bodies, including an upstream nozzle body and a downstream nozzle body coupled in tandem via a removably fastened connection, and a nozzle tip disposed in a downstream end of said downstream nozzle body;

wherein each of said nozzle bodies includes at least one heater attached thereto and wherein each of said nozzle tips does not have a separate heater connected directly thereto.

22. The injection molding apparatus of claim 21, wherein each of said nozzle bodies has a first heater at least partially embedded therein.

23. The injection molding apparatus of claim 22, wherein each of said nozzle bodies includes at least two heaters.

24. The injection molding apparatus of claim 23, wherein each of said nozzle bodies includes a second heater at least partially embedded therein.

25. The injection molding apparatus of claim 23, wherein each of said nozzle bodies includes a second heater embedded in a heating band coupled to said nozzle body.

26. An injection molding apparatus, comprising:
a manifold defining at least two manifold channels;
at least two nozzles, each of said nozzles defining a nozzle channel in fluid communication with one of said manifold channels;
at least one of said nozzle including at least two nozzle bodies, including at least a upstream nozzle body and a downstream nozzle body removably fastened in tandem;
wherein each of said nozzle bodies includes at least a first heater and a second heater, wherein at least said first heater is embedded into said nozzle body.

27. The injection molding apparatus of claim 26, wherein said second heater is embedded in a heating band surrounding an outside surface of said nozzle body.

28. The injection molding apparatus of claim 27, wherein said heating band comprises a material having a high thermal conductivity.

29. The injection molding apparatus of claim 26, wherein each of said first heater and said second heater have separate electrical connections extending therefrom.

30. The injection molding apparatus of claim 26, wherein said downstream nozzle body includes an electrical connection for at least one of said first and second heaters with leads exiting said injection molding apparatus through a bore between a first and second mold plate.

31. The injection molding apparatus of claim 26, wherein said downstream nozzle body includes an electrical connection for at least one of said first and second heaters with leads drawn along an opening in a mold plate into which said nozzle is inserted.

32. The injection molding apparatus of claim 26, wherein a nozzle tip is disposed in a downstream end of said downstream nozzle body;

33. The injection molding apparatus of claim 32, wherein said nozzle tip is not heated by a separate heater attached directly thereto.

34. The injection molding apparatus of claim 26, wherein both said first heater and said second heater are embedded in said nozzle body.